MORPHOLOGY OF FINAL INSTAR *OCHROTRICHIA XENA* (TRICHOPTERA: HYDROPTILIDAE)[1]

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ABSTRACT: Morphological descriptions of final instar *Ochrotrichia xena* are given. Specimens were collected from a small woodland stream in northeastern Ohio. This species is readily separated from other described *Ochrotrichia* larvae by the mandible morphology, two setae on the posterolateral corner and bristles on the inner margin of the right mandible only, pale rectangular prosternal sclerites, and oblate dorsal sclerotized abdominal rings.

Ochrotrichia is the second largest genus of microcaddisflies (Trichoptera: Hydroptilidae) in North America with over 50 species (Wiggins 1996a), but few larval/adult associations have been recorded. Few *Ochrotrichia* larvae have been described (Flint and Herrmann 1976, Vaillant 1984, English and Hamilton 1986), and identification of field collected larvae is impossible without the benefit of rearing males. Huryn and Foote (1983) recorded four species from Ohio, and Keiper and Foote (1998) recently reported *O. xena* (Ross) as a new state record bringing the total to five. The larvae dwell in mats of the filamentous green alga *Cladophora* (Chlorophyta) growing in a small woodland stream, and consume the contents of individual cells within these filaments. Larvae of *O. wojcickyi* Blickle and *Hydroptila jackmanni* Blickle co-occur with *O. xena* (Keiper and Foote 1998).

Ross (1944) gave a brief description of fifth instar *O. xena*, but this was limited to total length and coloration. Herein, I provide morphological descriptions of the fifth instar, and compare its morphology to those species described previously.

MATERIALS AND METHODS

Keiper and Foote (1998) described South Fork Eagle Creek (OH, Portage Co.) where larvae were collected and described the rearing techniques used to associate the larvae and adults. Most specimens were used to rear adults for species identification, but several fifth instars were killed in near boiling water, fixed in Kahle's solution, and preserved in 70% ethanol. Morphological descriptions are based on 13 living and five preserved specimens; head capsule width measurements were taken from 10 living and five preserved specimens, and other measurements given were obtained from three preserved specimens. Measurements were made with a Wild MZ-8 dissecting microscope outfitted with an ocular micrometer, or with a Leica compound light microscope (slide-mounted specimens). Values are given as mm (mean ± 1 S.E.). Tagged Image

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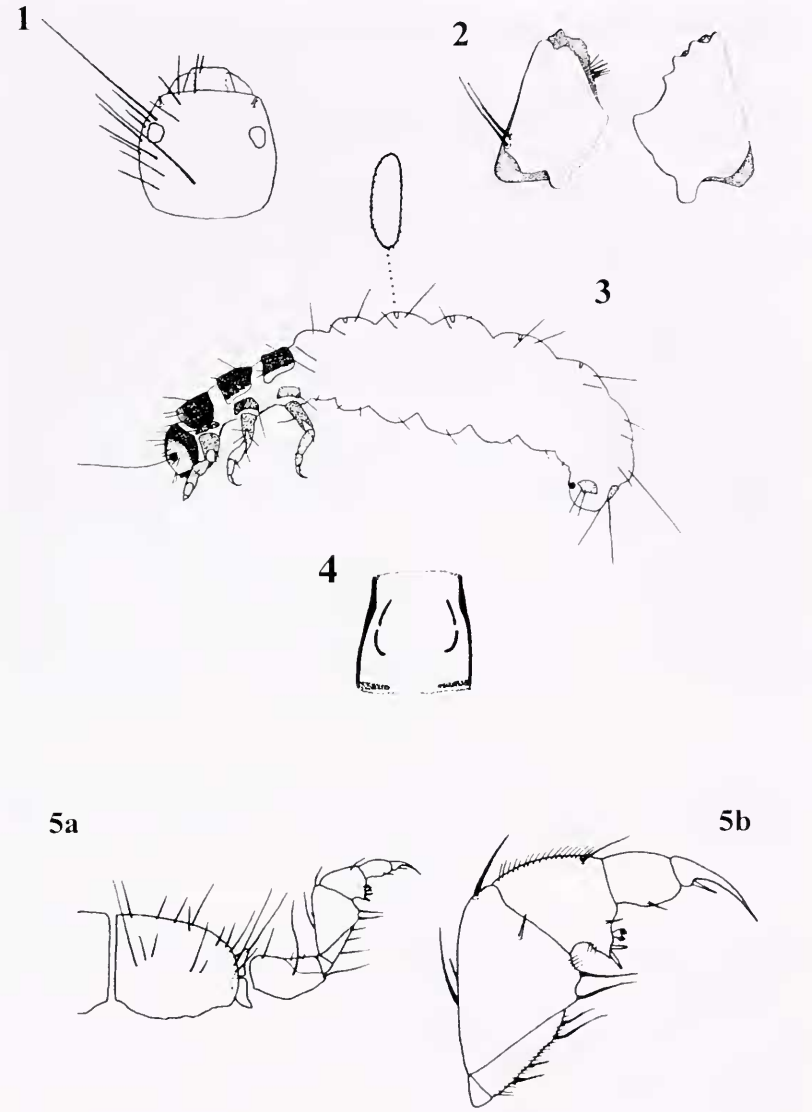
Format (TIF) files of preserved larvae were obtained using a low light camera attached to the microscopes and Image Pro Plus™ software on an IBM personal computer; TIF images were printed with a laser printer, and the images traced on a light table to facilitate illustration.

RESULTS AND DISCUSSION

Fifth instar. Head capsule: length 0.227 ± 0.001, width 0.205 ± 0.0; dark brown, with pale area around eyes reaching anterolateral margin broadly; faint muscle scars scattered postero-dorsally; primary setae as in Fig. 1; antennae short, inconspicuous, approximately 0.5x diameter of eye spot; mandibles dark brown, asymmetrical, right with two setae on posterolateral corner and bristles on inner margin, left lacking setae and bristles, both with robust cusps (Fig. 2). Thorax: prothoracic sclerite dark brown, lateral and posterior margins black, anterior margin with narrow pale area not reaching lateral margins, primary setae as in Fig. 3, length 0.155 ± 0.003; mesothoracic sclerite dark brown, pale lateral margins ~ 0.025 wide, muscle scars scattered posteriorly; metathoracic sclerite dark brown, pale lateral margins ~ 0.100 wide, anterolateral corner produced and encompassed by pale margin, muscle scars scattered posteriorly; membranous areas milky white; prosternum with two faint poorly-defined sclerotized areas posteriorly (Fig. 4). Legs: coxae and femora dark brown, legs becoming increasingly pale distally, tarsi light brown; anterior face of coxae with long seta subequal to length of coxa; prothoracic leg 0.305 ± 0.018, tibia with row of fine hairs dorsally and ventral projection with two stout apical setae, tarsal claw gradually curved (~ 0.05 long), basal seta approximately 0.3-0.4x length of claw (Fig. 5); mesothoracic leg 0.385 ± 0.010 long; metathoracic leg 0.410 ± 0.019 long; ratio of legs 0.75:0.9:1.0, prothoracic to metathoracic, respectively. Abdomen: distended greatly in mature specimens, concolorous with membranous areas of thorax, no lateral protuberances, venter of some segments invaginated slightly (not observed in living specimens); first, seventh, and eighth segments lacking sclerites; oblate dorsal sclerotized rings on segments 2-6 only, inconspicuous (Fig. 3); segment nine with pale rectangular dorsal sclerite; segment 10 with small brown sclerites on anal prolegs, anal claw small and dark brown contrasting all other abdominal sclerites (Fig. 3). Case: Purse-like, composed of two silken valves with mineral and detrital material attached, similar to those illustrated by Ross (1944) and Wiggins (1996b) for *Ochrotrichia*.

Extrapolating head capsule width for early instars using Dyar's Rule (Dyar 1890) gives values of 0.072 mm, 0.094 mm, 0.122 mm, and 0.158 mm for instars 1-4 respectively. Previous work with other hydroptilid species from four genera indicates that Dyar's Rule accurately predicts head capsule width for Hydroptilidae (Keiper and Foote 1999, J.B. Keiper, pers. obs.).

Ochrotrichia xena is readily separated from other described *Ochrotrichia* spp. based on its mandibular structure, two setae on the posterolateral corners of the right mandible vs. none on the left, presence of bristles on the inner margin of the right mandible, prosternal sclerites pale and not well defined, and dorsal abdominal ring sclerites oblate. *Ochrotrichia arizonica* Denning and Blickle (English and Hamilton 1986), *O. susanae* Flint and Herrmann (Flint and Herrmann 1976) and *O. anisca* (Ross) (Ross 1944) also have dorsal abdominal ring sclerites, but these species exhibit sclerites that are rounded to quadrate; the co-existing larvae of *O. wojcickyi* also have quadrate sclerites (J.B. Keiper, pers. obs.). Other described species such as *O. riesi* Ross (Ross



Figs. 1-5. *Ochrotrichia xena*. 1. Head, dorsal view. 2. Mandibles, ventral view (modified from Keiper and Foote 1998). 3. Fifth instar, lateral view with enlargement of dorsal abdominal sclerite of segment three. 4. Prosternum, anterior up. 5a. Right half of dorsal prothoracic sclerite and leg. 5b. Enlarged view of right prothoracic femur, tibia, and tarsus.

1944) and *O. confusa* (Morton) (Vaillant 1984) have robust, darkly-pigmented sclerites.

Larval *Hydroptila* and *Ochrotrichia* are very similar morphologically and are often separated by differences in sclerite shape or number (Peckarsky et al. 1990, Morse and Holzenthal 1996). One such character is *Hydroptila*'s lack of the protruded anterolateral metathoracic corner which is exhibited by *Ochrotrichia*; *O. xena* exhibits a very pale lateral margin and anterolateral corner. Cursory inspection of *O. xena* in lateral view can lead to misidentifications of larvae as *Hydroptila* because the elongated area is nearly concolorous with the membranous areas of the thorax. It is recommended that stream-dwelling larvae identified as *Hydroptila* be viewed at higher power (30x minimum) and at different angles relative to the light source to determine if a pale protrusion is present on the metathorax. An alternative character used to separate these two genera is the number of prosternal sclerites, with *Ochrotrichia* usually having two and *Hydroptila* three (Wiggins 1996b). However, some *Ochrotrichia* have three (Wiggins 1996b) and some *Hydroptila* have only two such sclerites (Wiggins 1996b, Keiper and Foote 1999), rendering this character somewhat unreliable. Wiggins (1996b) notes that *Hydroptila* spp. fifth instars have three short posterior gills which are lacking in *Ochrotrichia*, but I have found that placing live specimens directly in 70% ethanol causes these gills to shrink occasionally and become useless taxonomically. These problems underscore Wiggins' pleas for the proper preservation of trichopteran larvae (Wiggins 1996b) and for further larva/adult associations (Wiggins 1990) to aid with taxonomic challenges commonly faced by aquatic entomologists working with Trichoptera.

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